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JANE LORING GRAY.

The death of Mrs. Jane Loring Gray, July 29, 1909, at Beverly, Mass., must have recalled to many of the readers of Rhodora pleasant memories of the days when they were welcomed at the old house in the Botanic Garden by Mrs. Gray and her husband, Asa Gray. Although Mrs. Gray was not herself a botanist, through her sympathy with her husband in his scientific work she became acquainted with most of the American botanists of his time and, as his companion during his travels in Europe, she met many distinguished foreign botanists of the last generation as well as some of the botanical lights of a still earlier generation. Her charming manner made her everywhere welcome and to her quick appreciation of all that was worth seeing and hearing was added an excellent memory which enabled her to picture to a younger generation the personal appearance, habits and surroundings of their distinguished predecessors.

Mrs. Gray, a daughter of Mr. Charles Greely Loring, was born in Boston, Aug. 27, 1821, and first became acquainted with her future husband in 1844 while he was delivering a course of lectures at the Lowell Institute in Boston. They were married on May 4, 1848. During the rest of her long life she lived at the Botanic Garden where all botanists were received with a hospitality in which simplicity lent an added charm to cordiality, so that even the bashful and those accustomed only to a rougher mode of life felt at once at home. They never forgot Mrs. Gray nor did she forget them. Never robust and during much of her life an invalid, Mrs. Gray was nevertheless able to endure the fatigues of travel better than many stronger persons. She accompanied her husband twice to California and went with him to Mexico when she had reached an age at which few persons would

care to make such a journey. She also went with him to England in 1850, sailing in a packet, as the longer voyage was expected to benefit her health, and later they made several other trips to Europe, the last being in 1887 shortly before Prof. Gray's death, Jan. 30, 1888.

After her husband's death Mrs. Gray led a quiet life always interested in botanists and their work and always glad to see visiting botanists until with advancing years she was forced to live in retirement. For several years she was absorbed in the arrangement of her husband's correspondence and edited the Letters of Asa Gray, which appeared in 1893 in two volumes. The Gray Herbarium, which had become the property of Harvard University, had but slight endowment, wholly inadequate to provide for its care and development. In 1899, however, the announcement was made of an anonymous offer of $20,000 to found an Asa Gray Professorship of Systematic Botany, a position to be united with the curatorship of the Gray Herbarium. The offer was made conditional on the raising of at least $30,000 as a Gray Memorial Fund for the further endowment of the Gray Herbarium. The required sum was raised, but even the University authorities were in ignorance of the name of the person who had made the offer. It was Mrs. Gray, and botanists will be glad to know that it was the wife of Prof. Gray, who, by her very substantial gift, awakened the new interest and initiated the movement which has led in recent years to a much more effective endowment of the herbarium which he founded.

Mrs. Gray's last days were passed with her family, who were always devoted to her. Had she lived a month longer she would have reached her 89th year, a life as long as it was happy and useful. The funeral services were held in the old house in Cambridge and, as they departed, the friends felt not only that an old friend had been taken from them but also that the house so rich in associations with the past was closed to them forever.—W. G. F.

A SYNOPSIS OF THE SPECIES OF ARCTIUM IN NORTH AMERICA.

M. L. Fernald and K. M. Wiegand.

For some time it has been apparent that the burdocks found in waste land in various parts of eastern America do not fall readily into the two or three catagories provided for them in our current manuals. Field observations during the past summer, and study of the accumulated material in the Gray Herbarium and the Herbarium of the New England Botanical Club, show that we have, established in America, four species which are commonly recognized by Old World botanists as growing in Europe. The peculiarities of the achenes, corollas, involucral bracts, and leaves, which are emphasized in European handbooks, so regularly accompany characteristic arrangements of the heads in the inflorescence, that upon the combination of these characters it is possible to classify all but the most immature material which has been examined.

As judged from the conclusions of European authors, the species of this genus hybridize rather freely, and therefore in this country we should expect occasional more or less intermediate hybrid forms. But as yet so little attention has been given to the genus in America that we are unable to state to what extent our own plants hybridize.

Plants with leaves somewhat laciniate or coarsely toothed have been reported from time to time as forms of *A. Lappa*, *A. minus* and *A. tomentosum*. One of the earliest records in America of such a variation was in Darlington's Flora Cestrica (1837) where Darlington said: "A variety has been observed here, occasionally, with pinnatifid leaves" (p. 436). Specimens collected by Darlington have nondescript inflorescences and on his label he states that "The inflorescence always has a kind of half-starved or semi-abortive appearance." A similar form has recently been described in an unsigned note in The American Botanist (xv. 83, 1909) as *A. minus* f. *laciniatum*, in which the "inflorescence was irregular with numerous small sterile flowers." The plants of this general character that we have seen have all the appearance of being teratological developments caused by some disturbing influence, and hardly merit special taxonomic treatment.

On account of certain obvious characteristics of the burdocks most

collectors are inclined to ignore them, and from this it follows that little material finds its way into the public herbaria. We are therefore unable to state full ranges for any of the species; but by the citation of characteristic specimens examined it is hoped that the following synopsis may be made more readily intelligible.

A. Heads corymbose, long-peduncled: leaf-blades round-ovate, obtuse; petioles strongly angular, deeply furrowed.

Petioles solid: *heads very large and broad*, 3–4.5 cm. in diameter;[1] *involucre glabrous*, green (rarely purple): *outermost bracts about* 1 *cm. long*; *the middle and inner* slightly longer, *subequal and exceeding the corollas*; *the innermost with pale firm slender gradually attenuate tips*: broad upper portion of corolla shorter than the slender tube: *achenes* 6–7 mm. long, *fawn-color*, often dark-mottled, *slightly rugose below the crenate-bordered summit*. . . . . 1. *A. Lappa*.

Petioles hollow: *heads smaller*, 2–2.7 cm. broad: *involucre* more or less *arachnoid*: *outermost bracts* 4–7 *mm. long*; *the middle and inner successively longer*, all or all but the inner conspicuously *shorter than the corollas*; *the innermost with membranous more or less colored blunt or cuspidate tips*: broad upper portion of the corolla as long as the tube: *achenes* 4.5–7 mm. long, *gray*, usually dark-mottled, *rugulose from base to the entire summit*. . . . . 2. *A. tomentosum*.

B. Heads racemose or subracemose, rarely long-peduncled: leaf-blades ovate-oblong, usually less obtuse; petioles slightly angular.

Petioles hollow: heads medium, 2.5–3.5 cm. broad: involucre glabrous or arachnoid, green or purplish: outermost *bracts* short, 5–7 mm. long; *the middle and inner* successively much longer, *equaling or exceeding the corollas*; the innermost long-attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5.5–7.5 mm. long, *dark-brown*, sometimes light-mottled, not rugulose, the summit entire. . . . . 3. *A. nemorosum*.

Petioles hollow: heads small, 1.5–2.5 cm. broad: involucre glabrous or arachnoid, green or purplish: the outer *bracts* short; *the middle and inner* successively much longer, all *conspicuously shorter than the corollas*; the innermost attenuate, firm and aristate: upper and lower portions of the corolla equal in length: *achenes* 5–6 mm. long, *gray or ashy-brown*, usually dark-mottled, smooth or faintly rugulose, the summit entire. . . . . 4. *A. minus*.

1. A. Lappa L. Sp. Pl. 816 (1753). *Arctium majus* Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa officinalis* All. Fl. Ped. i. 145 (1785). *Lappa major* Gaertn. Fruct. ii. 379 (1791). *Arctium Lappa*, var. *majus* Gray, Syn. Fl. i. pt. 2, 397 (1878).— Typical specimens examined. New Brunswick: dry roadside, Four Falls, Aug-

[1] These measurements of the heads include the spreading tips of the bracts.

ust 14, 1901 (*B. L. Robinson*). MAINE: roadside, Houlton, August 12, 1909 (*Fernald & Wiegand, Fernald*, no. 2269). NEW HAMPSHIRE: Tamworth, September 6, 1903 (*F. S. Collins*); Walpole, August 4, 1900 (*Noyes and Fernald*, no. 380); near dwellings, Jaffrey, July 29, 1897 (*B. L. Robinson*, no. 298). VERMONT: roadside, Westmore, July 26, 1896 (*E. F. Williams*). MASSACHUSETTS: Malden, July 31, 1887 (*F. S. Collins*); Sherborn, August 3, 1909 (*Miss M. L. Loomis*); waste land, Boston, August 11, 1898 (*E. F. Williams*). CONNECTICUT: Plainville, August 31, 1904 (*L. Andrews*).

The typical form of this species has an involucre which is green throughout.

Var. **purpurascens** (LeGrand) n. comb. *Lappa major*, sub-var. *purpurascens* LeGrand, Bull. Assoc. franc. Bot. ii. 69 (1899).—Involucre strongly suffused with purple.—Typical specimen examined from VERMONT: roadside, Cornwall, August 22, 1900 (*E. Brainerd*).

2. A. TOMENTOSUM Mill. Gard. Dict. ed. 8 (1768). *Arctium Lappa* β, L. Sp. Pl. 816 (1753). *A. Bardana* Willd. Sp. Pl. 1632 (1804). *A. Lappa*, var. *tomentosum* Gray, Synop. Fl. I, pt. 2, 397 (1878), at least as to synonyms. *Lappa tomentosa* Lam. Fl. Fr. ii. 37 (1778).—Typical specimens. MASSACHUSETTS: vacant lot, corner Parker Street and Buckingham Street, Cambridge, July 9, 1886 and July 28, 1908 (*Walter Deane*); waste ground, Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 3); field where rubbish had formerly been dumped, Westford, July 12 and 21, 1909 (*Miss E. F. Fletcher*). CONNECTICUT: waste ground, Naugatuck, July 19, 1908 (*A. E. Blewitt*, no. 16).

3. A. NEMOROSUM Lejeune in Lejeune & Courtois, Comp. Fl. Belg. iii. 129 (1836). *A. intermedium* Bab. Man. Brit. Bot., ed. 8, 202 (1881).

This species is very variable and seems to occur with us in three pronounced forms which, owing to the need of further observations in the field and of clearer understanding of the Old World variations, it seems wisest to treat for the present without names. The condition in Europe is somewhat as follows. In many European manuals, in addition to the four species here treated, a fifth is given which is said to differ from *A. nemorosum* in having long-peduncled larger heads with the involucre more open above and more or less arachnoid. This is the *A. intermedium* of Lange (Dansk. Fl. ed. 1, 463, 1851), *A. pubens* of Babington (Ann. & Mag. Nat. Hist. ser. 2, xvii. 376, 1856), *Lappa intermedia* of Reichenbach (Icon. Fl. Germ. xv. 54, t. 812, 1853) also of Lange (Fl. Dan. t. 2663, 1861), and *A. majus*, sub-sp. *nemorosum* of Rouy and Foucaud (Fl. Fr. ix. 95, 1905). The exact status of this fifth species, however, is very confused, both as to whether it is distinct

from *A. nemorosum* and as to just what forms the authors of *A. nemorosum, pubens,* and *intermedium* had in mind when these names were published. The confusion in Great Britain, especially, is well summed up by Beeby in the Journ. Bot. xlvi. 380–382 (1908), who concludes after a study of authentic specimens of Lange's *A. intermedium,* that his species, so far as those specimens are concerned, consists of two forms: "first, a rather large-headed form of *A. minus* corresponding to var. *purpurascens* Blytt," and "secondly, the hybrid *A. majus* × *minus*." Beeby, in his study of the genus *Arctium,* also obtained a presumably authentic specimen of *A. nemorosum* collected by Lejeune himself and found it to be a form with heads agglomerated and almost sessile, rather than long-peduncled, and therefore agreeing both with the original description and also with the interpretation of most recent authors except Rouy & Foucaud. He says "I very much doubt whether we have any fourth species [in Great Britain] to support the name *A. pubens* Bab. If so, I am unacquainted with it, though I believe that Messrs. Groves are satisfied of the existence of such a plant."

Among our American forms the one here treated as *A. nemorosum,* form *a* agrees most closely with what the type is supposed to be. The form *c,* on the other hand, agrees fairly well with the description of *A. intermedium* Lange and *A. pubens* Bab.; but considering the doubt in the minds of European authors as to the exact status of these names and also the fact that, in America at least, the form here called form *b* combines characters of both form *a* and form *c,* it seems unwise at present to attribute any names whatever to the three forms here described. Whether they are really distinct forms, and what relation they bear to the above names cannot be determined with our present inadequate knowledge.

(*a*) Heads sessile or subsessile, the uppermost tending to be clustered: involucre glabrous to slightly arachnoid. — Typical specimens. Maine: around dwellings, Orono, September, 1889 (*Fernald*). New Hampshire: near dwellings, Jaffrey, July 27, 1897 (*B. L. Robinson*). Massachusetts: Springfield, August 17, 1904 (*L. Andrews*). Rhode Island: Providence, September 19, 1899 (*J. R. Churchill*). Connecticut: roadside, Southington, August 25, 1904 (*L. Andrews*). Illinois: waste places, St. Clair Co., August 14, 1893 (*H. Eggert*). Kansas: woods, Riley Co., August 24, 1895 (*J. B. Norton,* no. 307).

(*b*) Heads scattered and peduncled: involucre glabrous or essentially so. — Typical specimens. Quebec: vicinity of Cap à L'Aigle, July 27, 1905 (*J. Macoun,* no. 68,237). Maine: Pembroke, July 23, 1909 (*Fernald & Wiegand*); Manchester, September 9, 1873 (*F. L. Scribner*).

(*c*) Heads scattered and peduncled: involucre copiously arachnoid.—Typical specimens. MAINE: Fort Fairfield, August 9, 1909 (*Fernald & Wiegand*); Dover, September 1, 1894 and August 28, 1896 (*Fernald*); North Berwick, September 5, 1894 (*J. C. Parlin*). MASSACHUSETTS, Stockbridge, August 23, 1902 (*R. Hoffmann*).

4. A. MINUS (Hill) Bernh. Syst. Verz. Erfurt. 154 (1800). *Lappa minor* Hill, Veg. Syst. iv. 28 (1762). *A. Lappa*, var. *minus* Gray, Syn. Fl. i. pt. 2, 397 (1878). Typical specimens. MAINE: Houlton, August 12, 1909 (*Fernald & Wiegand*); Rumford, 1887 (*J. C. Parlin*); Hanover, September 10, 1889 (*J. C. Parlin*); East Auburn, August 27, 1896 (*E. D. Merrill*, no. 556); North Berwick, August 31, 1894 (*J. C. Parlin*). NEW HAMPSHIRE: Walpole, August 4, 1900 (*Fernald*, no. 377); VERMONT: Manchester, July 12, 1898 (*M. A. Day*, no. 104). MASSACHUSETTS: Malden, August 8, 1886 (*F. S. Collins*); Cambridge, August 30, 1908 (*C. A. Weatherby*, no. 2); Oak Island, Revere, August 20, 1882 (*H. A. Young*); Boston, August 17, 1866 (*Wm. Boott*); Blue Hills, September 1, 1895 (*W. H. Manning*). ONTARIO: Ottawa, August 4, 1894 (*J. Macoun*).

NOTES ON PELTANDRA, RAFINESQUE.

IVAR TIDESTROM.

(Plate 83.)

During the season of 1904, while searching for aquatic and marsh plants at Cameron Run, near Alexandria, Virginia, I noticed a number of *Peltandrae* in the marsh adjoining the creek. There appeared to be two distinct forms and I naturally supposed the second form to be *P. sagittifolia*, but upon examination the dark green seed disproved my supposition. The difference between the two forms was very marked: the one was robust having ample leaves and a rather large head of fruit, while the other was slender, its leaves narrow-oblong and its head of fruit much smaller. It is true that the leaf-form in many if not in all of our *Araceae*, is very variable, and that even on a single plant we may find leaf-outlines ranging between the maximum and the minimum for that species; yet in the case of our *Peltandrae* there are characters upon which we may possibly recognize two or three long since forgotten forms.

The genus, as diagnosed by Rafinesque (in Journ. de Physique **89**: 103, 1819), included three species (?) known to him, as the following sentence in the above cited publication would indicate: — "Les *Calladium sagittaefolium* et *C. virginicum* se rapportent à ce genre; mais je le base sur une nouvelle espèce *P. undulata.*" In his "*New Flora of North America*" (1836), Rafinesque redefines his genus, giving a number of generic synonyms: he enumerates and describes eight species giving synonyms in all but two instances: he attributes four species to the North and the remaining ones to the South Atlantic States. As our field study has been limited to Maryland and Virginia, we shall only deal with forms collected within the above named States.

Peltandra virginica (L.) Kunth. Rafinesque (l. c.) appears to have been in doubt about the identity of this species for he reverses his opinion about *P. undulata* and brings in *Arum virginicum* L. as a synonym. The history of the latter is very interesting. There is little room for doubt but that Banister knew this species,— so common in all our marshes and along our river banks. Plukenet has the following note under his *Arum minus Sagittariae foliis ex Insula Barbados* [*Xanthosoma sagittaefolium* (L.) Schott] :— "Fortè etiàm Arum aquaticum *Virginianum*"....*Banisteri Cat. Virg. de hujus radice Tockawaugh apud Ogilveium dicta, & aliis Tockahoe, panem conficiunt Indigenae Virginienses, sicut olim Aegypti fecerunt de sua Colocasiae radice.*" (Pluk. Alm. Bot. 51. 1696). The reference to the vernacular name Tockahoe is extremely interesting since this name is still applied to *Peltandra virginica* in Maryland and Virginia. I have heard it applied to our plant in the region along the Patuxent River and between Alexandria and Fredericksburg.

Morison (Plant. Hist. **3**: 545. 1698) notes some characters which indicate that he had the true *Arum virginicum*: — "*Arum aquaticum foliis in acumen desinentibus, fructu viridi, Plantam hanc* Virginiae *alumnam nobiscum communicavit* D. Jo. Banister. *Radix* arundinacea & geniculata, folia è rotunda basi, in acutum mucronem desinentia emittit; fructusque virides. *An vero in rubedinem prae* maturitate transmutentur necne, parum est nobis compertum."

Linnaeus (Hort. Cliff. 435, 1737.) supplements his brief description with this note: — "*Foliorum longitudo semipedis, petiolorum vero pedalis; angulis obtusis a specie* 2^{da} [*Arum maculatum* L.] *differt, foliisque magis oblongis; petioli nigro-purpurascentes sunt, ut & margo foliorum, quod in hac speciale est.*" By examining typical

specimens of *Arum maculatum*, which species Linnaeus uses for comparison, we might suppose that a narrow-leaved form was at hand since the leaves of the latter species are rather narrow and the term *oblongus* as used by Linnaeus and illustrated by him in *Philosophia Botanica* implies an outline (nearly) elliptical in which the relation of the major axis to the minor is nearly three to one. Knowing the intimate fellowship that existed between Gronovius and Linnaeus that the former helped the latter in polishing up the descriptions, while the masterly hand of Linnaeus is clearly seen in the descriptions themselves, we must take account of the description in *Flora Virginica* as forming part of the concept of the species as held by Linnaeus. The descriptions in *Flora Virginica* and *Species Plantarum* appear to embrace a broad-leaved form,—undoubtedly the typical plant of our region.

Richard, the anonymous author of Michaux's Flora (**2**: 187. 1803) makes the following observation with regard to his *Calla virginica* (*Arum virginicum* L.) "Variat foliis angusto-oblongis," which proves that at that time the typical form of the species was held to be a broad-leaved one. This view is supported by Hooker (Exot. Fl. t. 182, 1827) in his description of *Caladium virginicum* (*Arum virginicum* L., *Calla virginica* Michx.). He states also:—"This plant appears to have been known in our gardens for nearly half a century; yet no figure, as far as I know, has yet been published of it." His illustration of the plant (l. c.) is an excellent one.

Peltandra virginica var. **heterophylla** (Raf.) comb. nov. *P. heterophylla* Raf.—To this species of Rafinesque I would refer without hesitation the narrow-leaved form collected by Dr. Greene at Marshall Hall, Md., in 1897, and by the writer in several places throughout our region. Rafinesque's description reads as follows:—"Petiols unequal terete, leaves variable oblong cuspidate, or ovatoblong hardly sagittate or nearly auriculate or base often entire obliqual, lobes unequal rounded short or ovate obtuse." . . . (Raf. New Fl. N. Am. **1**: 88. 1836). So far as I know this form is always found with the type. The earliest leaves are similar in all the forms: the mature leaves in the type are large, 30 cm. or longer, palmately 3-ribbed, equilaterally triangular, nearly cucullate, i. e. the planes of the lobes form an obtuse and sometimes a right angle with the plane of the upper part of the leaf: in var. *heterophylla*, on the other hand, the mature leaves are barely 20 cm. in length and rarely 6 cm. in width, 1-ribbed, somewhat sagittate,

cordate, or unequally rounded at the base. The same proportions as to size obtain with respect to the spathe, spadix and head of fruit of the two forms. The seed of the two forms germinate in exactly the same manner. The germination has been described by Dr. Th. Holm (Mem. Torr. Bot. Club **2**: 88, 1891.)

Peltandra virginica var. **angustifolia** (Raf.) comb. nov. *P. angustifolia* Raf.—"Leaves hastate cordate narrow oblong, lobes obtuse".... (Raf. l. c. 89). What has been said in the case of var. *heterophylla* might be repeated of this form. In June, 1906, I observed in Nanjemoy Creek, Md., some plants growing with *P. virginica* which approach nearly the concept of *P. angustifolia*. The leaves are mostly rounded at the base, but occasionally halberd-shaped; the blades are 2.5–3 dm. in length and barely 4 cm. wide. So far as external characters are concerned this form appears to be farther removed from the type than var. *heterophylla*.

Type specimens have been deposited at the Gray Herbarium.

Bureau of Plant Industry,
U. S. Department of Agriculture, Washington, D. C.

Explanation of Plate 83.

Fig. 1. Typical leaf of *Peltandra virginica*.
Figs. 2 & 3. " leaves of *P. virginica* var. *heterophylla*.
Fig. 4. " leaf of *P. virginica* var. *angustifolia*.
(For these drawings thanks are due to Mrs. Agnes Chase.)

THE NORTH AMERCAN VARIATIONS OF LYCOPODIUM CLAVATUM.

M. L. Fernald and C. H. Bissell.

In 1831 Greville & Hooker described from the Canadian Rocky Mountains a 1-spiked variety of *Lycopodium clavatum* as

"Var. *β. monostachyon*; spica solitaria, pedunculis brevibus" from "The Rocky Mountains, north of the Smoking River, in lat. 56°. North America. *Mr. Drummond.*— The variety *β.* is a remarkable one. The whole plant is more compact, the leaves less dentato-ciliate,

and less closely imbricated: the spikes solitary in all the specimens, and supported on a peduncle scarcely more than an inch in length." [1]

Although the variety *monostachyon* was included by Macoun in his Catalogue of Canadian Plants in 1888, it was generally overlooked by American botanists until ten years ago. And though the short peduncles, as described by Greville & Hooker, were not matched by the longer peduncles of a 1-spiked plant much collected during the early part of the present decade in New England and eastern Canada, it was thought advisable to refer the eastern plant, provisionally at least, to var. *monostachyon*, and under this name it has passed in recent publications.[2]

In a discussion of the plant, Dr. R. M. Harper, referring to the original description, said: "This does not exactly describe the New England plant, but as the original specimens came from the Rocky Mountains, in latitude 56°, they were probably dwarfed by the arctic-alpine conditions. . . . A specimen in the herbarium of the New York Botanical Garden, collected by R. S. Williams near Lindeman, Yukon Territory, May 4, 1898, corresponds fairly well with the original description." [3] Other specimens apparently similar to the original are cited by Harper from the Saskatchewan River and Lake Superior.

The large amount of material accumulated since attention was recently called to the 1-spiked plant makes it now possible to estimate more exactly the varietal importance of the short peduncle described by Greville and Hooker. In the 60 or more sheets of the 1-spiked plant examined we find, as already indicated by many who have written of the plants (though not by Greville & Hooker who had but a single collection), that the leaves are generally more ascending and appressed than in ordinary *Lycopodium clavatum*, and those of the ascending branches are slightly if at all dentate-ciliate. In the three sheets which have recently come to hand from the mountains of western Canada — specimens from the Klondyke, Yukon Territory (*MacLean*) and from the Selkirk Mountains of British Columbia (*C. H. Shaw*, nos. 458 and 1078) — the peduncles vary from 0.5–2.5 cm. long and the mature spikes from 1.5–3.5 cm. in length and 3–4 mm. in thickness. Somewhat immature specimens from the south-

[1] Grev. & Hook. in Hook. Bot. Misc. ii. 375, 376 (1831).

[2] M. L. Fernald, Rhodora, iii. 169 (1901); B. L. Robinson, ibid., iii. 237 (1901); R. G. Leavitt, ibid., iv. 57 (1902); R. M. Harper, ibid., iv. 100 (1902).

[3] Harper, l. c.

western corner of the Labrador Peninsula — Seven Islands, Saguenay Co., Quebec (*C. B. Robinson*, no. 839) — are apparently the same; and material from near Cape Horn in the alpine region of Mt. Washington, New Hampshire, though having the spikes slightly longer (2–4 cm. long) and thus approaching the commoner 1-spiked plant of the East, has the peduncles only 0.7–2.5 cm. long. In these plants from the mountains of Yukon and British Columbia, from Saguenay County, Quebec, and the alpine region of Mt. Washington, as well as in those cited by Harper from Yukon, the Saskatchewan, and Lake Superior, we have a series of specimens from subarctic and alpine regions which agree closely with the original description of var. *monostachyon* from "the Rocky Mountains north of the Smoking River, in lat. 56°," with the "peduncle scarcely more than an inch in length." On a sheet of mixed specimens in the Gray Herbarium, showing variations of *L. clavatum* from Ajan (Ayan) on the Ochotsk Sea (*Regel & Tiling*, no. 343),[1] are plants with peduncles 1.5–2.5 cm. long and spikes 3.5–4 cm. in length, thus indicating that var. *monostachyon* occurs also in northeastern Asia. Another specimen on this sheet has elongate slender peduncles but is not satisfactorily referable either to var. *monostachyon* or its commoner representative of eastern America.

The common 1-spiked plant of eastern America, which is familiar to practically every field-botanist of New England and the Maritime Provinces, has very long peduncles and very long spikes. Measurements of the more than 50 specimens studied show the mature spikes of this plant to range from 3.5–11 cm. long, and the peduncles from 4.5–15 cm. long. This plant with long peduncles and spikes does not occur in the arctic-alpine areas, but is abundant throughout the cooler forested country from the North Shore of the St. Lawrence, the Gaspé Peninsula of Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut, and it extends locally westward to Michigan. Although occasionally bearing a few peduncles with 2 large spikes,[2] in subalpine situations rarely having peduncles only 2–4 cm. long, and in its appressed leaves and rigid habit approached by exceptional colonies of *L. clavatum* (when the latter grows in exposed or very sunny situations), the plant is ordinarily so strongly marked by its appressed leaves, rigid habit, and long-peduncled large solitary spikes, as to be accepted by all who are

[1] See Regel & Tiling, Fl. Ajan. 127 (1858).
[2] See B. L. Robinson, Rhodora, iii. 237 (1901)

familiar with it in the field as a pronounced variety of *L. clavatum*. That this common 1-spiked plant of our northeastern forested area is not true var. *monostachyon* is obvious; and, since it so rarely shows any marked intergradation to it in the length of peduncles and spikes, we here propose it as

Lycopodium clavatum L., var. **megastachyon**, n. var., foliis apice piliferis, caulinis dentatis vel integris, rameis plerumque adpressis integris vel subintegris; ramulis strictis; pedunculis 4.5–15 cm. longis; spicis solitariis 3.5–9 cm. longis 3.5–5 mm. crassis.

Leaves bristle-tipped, those of the creeping stem dentate or entire, of the strict branches usually appressed and entire: peduncles 4.5–15 cm. long: spikes solitary, 3.5–11 cm. long, 3.5–5 mm. thick.—Widely distributed from Charlevoix and Gaspé Counties, Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut; and locally westward to Michigan. Among the many specimens examined, the following are typical. Quebec, vicinity of Cap à L'Aigle, August 11, 1905 (*J. Macoun*, no. 69,273); dry spruce woods, Douglastown, August 22, 1904 (*Collins, Fernald & Pease*): New Brunswick, open spruce woods, Grand Falls, August 14, 1901 (*Fernald* — type specimen in Gray Herb.): Nova Scotia, roadside near "Half-way House," Cape Breton Island, August 17, 1904 (*J. R. Churchill*): Maine, in loam, open spruce woods, Ashland, August 8, 1901 (*Plantae Exsiccatae Grayanae*, no. 59); Sargent Mt., Mt. Desert Island, Sept. 1, 1906 (*E. L. Shaw*); Orono, October 17, 1890 (*Fernald*); woods, Bethel, October 21, 1902 (*W. Deane*); open woods, Bristol, August 23, 1897 (*E. B. Chamberlain*, no. 439): New Hampshire, slopes of Mt. Washington, August 7, 1901 (*E. F. Williams & B. L. Robinson*, no. 810); Sandwich, August 10, 1906 (*F. W. Batchelder*); spruce woods, Alstead, July 31, 1901 (*Fernald*): Massachusetts, Boxford, 1881 (*C. N. S. Horner*); Hoosac Plateau, Otis, September 24, 1904 (*R. Hoffmann*): Connecticut, moist soil, north border of pine woods, Simsbury, August 12, 1904 (*Bissell*); Franklin, August 3, 1906 (*R. A. Woodward*): Michigan, very common in poplar woods, Gwinn, Marquette Co., September 19, 1909 (*A. K. & G. C. Harrison*).

A singular plant collected by Messrs. Arthur K. and Walter H. Harrison on the summits of the Taconic Mountains in Hancock, Massachusetts, and near Lebanon Springs, New York, has the rigid branches and appressed leaves of var. *megastachyon*. Its usually simple whip-like peduncles, however, are 2–4.5 dm. long and bear no true fertile spikes. This plant seems to be a remarkable sterile state of var. *megastachyon*, but it is unwise to base a record for the variety from New York upon such anomalous material.

Lycopodium clavatum, var. *brevispicatum* Peck,[1] known only from a single station on the summit of Wallface Mt. in the Adirondacks, is a very remarkable plant with the short broadish leaves crowded and incurved much as in *L. Selago,* var. *appressum* Desv., the peduncles 3.5–5.5 cm. long, and the mostly solitary short blunt ellipsoid or thick-cylindric spikes 1–2.5 cm. long, 5–7 mm. thick. In these very thick and short blunt spikes it is apparently unlike any other known variety of *L. clavatum.*

While studying the variations of *Lycopodium clavatum* in North America, we have been impressed with the fact, that nearly all the material in the Gray Herbarium from west of the Rocky Mountains differs from the common and essentially typical form of the species in nearly or quite lacking from the leaves of the upright branches the slender soft bristle, which so regularly terminates at least the young leaves of true *L. clavatum.* The typical form of the species, with the soft bristle terminating the leaf, extends westward to the Great Lakes; and there is in the Gray Herbarium a very characteristic specimen of it from the Cascade Mountains, latitude 49, collected by Lyall in 1859. But all the other specimens before us — ranging from the Aleutian Islands to Oregon — have the leaves of the ascending branches entire or subentire and mostly lacking the bristle-tip. This plant is clearly *L. clavatum,* var. "δ. *integerrimum*: foliis omnino (caulinis quoque) integerrimis muticis" of Spring,[2] based upon *L. clavatum* δ of Hooker's Flora Boreali-Americana, which was described as follows: "δ. foliis omnino integerrimis muticis....N. W. America, from Observatory Inlet, *Dr. Scouler,* to Stikine; and on Mount Rainier. *Tolmie.*" [3]

The differential characters of the more pronounced variations of *Lycopodium clavatum* in North America, as understood by the writers, may be briefly summarized as follows.

* Peduncles bearing usually 2 or more fruiting spikes.

+– Leaves of the ascending branches bristle-tipped, ordinarily somewhat spreading.

L. CLAVATUM L. Sp. ii. 1101 (1753). Eurasia. Newfoundland to North Carolina, west to Ontario and Michigan; also in the Cascade Mts. (*Lyall*).

+– +– Leaves of the ascending branches mostly not bristle-tipped either spreading or ascending.

[1] Peck, 54th Ann. Rep. N. Y. St. Mus. 162 (1901).
[2] Spring, Mon. Lyc. i. 90 (1841).
[3] Hook. Fl. Bor.-Am. ii. 267 (1840).

Var. INTEGERRIMUM Spring, Mon. Lyc. i. 90 (1841). Aleutian Islands to Oregon.

* * Peduncles normally bearing 1 fruiting spike; leaves ordinarily appressed or ascending.

+– Spikes slender-cylindric, at most 5 mm. thick.

++ Peduncles 0.5–2.5 cm. long; spikes 1.5–3.5 (rarely 4) cm. long, 3–4 mm. thick.

Var. MONOSTACHYON Grev. & Hook. in Hook. Bot. Misc. ii. 375 (1831). Saguenay Co., Quebec; alpine region of Mt. Washington, New Hampshire; Lake Superior; Rocky Mountains from Yukon to Alberta and British Columbia; Amur.

++ ++ Peduncles 4.5–15 cm. long; spike 3.5–11 cm. long, 3.5–5 mm. thick.

Var. MEGASTACHYON Fernald & Bissell. Var. *monostachyon* of many recent authors, not Grev. & Hook. Charlevoix and Gaspé Cos., Quebec, and Cape Breton Island to Vermont, western Massachusetts, and western and southern Connecticut; and locally westward to Michigan; passing to the preceding in subalpine situations.

+– +– Spikes ellipsoid or thick-cylindric, 1–2.5 cm. long, 5–7 mm. thick; peduncles 3.5–5.5 cm. long.

Var. BREVISPICATUM Peck, 54 Ann. Rep. N. Y. State Mus. 162 (1901). Summit of Wallface Mt., New York.

HYPERICUM AUREUM A CASUAL PLANT IN EASTERN MASSACHUSETTS.— In August 1909 I had a plant brought to me which proved to be *Hypericum aureum* Bartram. It was found by a lady while on a ride from Boston. I later learned from her that it was found below Billerica where she left her automobile to gather some *Thalictrum polygamum* and not near any garden. A few weeks later one plant was found growing near our village in an old lane where the usual confusion of bushes grew. The plant was two feet or more high and the seed pods of 1908 were still on it. Later I observed plants of the same kind in a hedge on private grounds about forty rods away. Birds must have carried the seeds.— EMILY F. FLETCHER, Westford, Massachusetts.

Notes on recent Publications.— A detailed descriptive and copiously illustrated flora of California is an undertaking of such magnitude that even its courageous inception becomes decidedly interesting. Of Professor Jepson's work[1] two fascicles, covering chiefly such arboreal groups as the pines, willows, and oaks, have been issued. Their plan is noteworthy. It is at once evident that the author has felt none of the space-limits which ordinarily tend to compression. The descriptions are unusually full, bibliography is generous, ranges are stated in much detail, and the text enlivened by decidedly popular notes. Thus we learn of *Quercus Sadleriana* that it is "Shade tolerant," that the acorns are eaten by bears, and that it is a "Browse shrub, the foliage greedily favored by mules." Collectors, type localities, altitudinal ranges, and numbered specimens in well known exsiccatae are cited in commendable detail. The introduction of complete keys and a careful attention to contrasting typography give lucidity notwithstanding the amount of matter presented. The illustrations are of two kinds. The line-drawings are of exceptional clearness, especially noteworthy in such structures as cones and acorns. The half-tone plates are of decidedly less botanical value. Notable is the serious attempt which the author has evidently made to distinguish plants of unlike taxonomic importance. He is not afraid of the varietal rank and has used it freely. By this means he has strengthened his specific category and is able to show many of the more intimate relationships. Long life to the author! He will need it before he gets through with his task.

Mr. Clute's Laboratory Botany[2] outlines a high school course, which seems to have a great deal in its favor. It is brief, and neither as to subject matter nor required apparatus is it likely to be beyond the powers of the teachers or pupils for which it is designed. Without excluding the use of the microscope and reagents, it is devoted specially to gross morphology. In this matter, and in a wholesome way, it is a trifle reactionary. The author does not shun technical descriptive terms and even introduces a few brief definitions. It is confidently believed that pupils inducted into botany by the aid of this brief course will be able on reaching the college or university not merely to tell something of gametes and plasmolysis but to astonish their professors by an ability to distinguish between a petiole and a peduncle, or possibly even to tell an achene from a seed — B. L. R.

[1] A Flora of California, by Willis Linn Jepson, Assistant Professor of Dendrology in the University of California. Pt. 1, pp. 33–64, pt. 2, pp. 337–368. 8vo. Cunningham, Curtiss & Welch, San Francisco.

[2] Laboratory Botany for the High School, by Willard N. Clute. 8vo. 177 pages. Ginn. & Company.

Vol. 12, no. 134, including pages 17 to 40, was issued 9 February, 1910.

Agnes Chase ad nat. del.

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